



GOVERNMENT OF
With PaWESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9339/1
File Number: DWERVT8166
Duration of Permit: From 15 June 2022 to 15 June 2024

PERMIT HOLDER

Shire of Serpentine Jarrahdale

LAND ON WHICH CLEARING IS TO BE DONE

Karnup Road (PINs 1372987 and 1372989), Mundijong
Bishop Road Reserves (PINs 1160722, 1160723, 11610724 and 11609323), Mundijong

AUTHORISED ACTIVITY

The permit holder must not clear more than 0.188 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

CONDITIONS

1. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of *native vegetation*;
- (b) minimise the amount of *native vegetation* to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

2. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

- (b) ensure that no known *dieback* or *weed*-affected soil, mulch, fill, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

3. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner from the road reserve to adjacent vegetation, to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

4. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> (a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 1; (f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 2; and (g) direction of clearing in accordance with condition 3.

5. Reporting

The permit holder must provide to the *CEO* the records required under condition 4 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION
*Officer delegated under Section 20
of the Environmental Protection Act 1986*

22 May 2022

SCHEDULE 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1 to 11).

9339/1 - Plan A



Figure 1: Map of the boundary of the area within which clearing may occur

9339/1 - Plan B

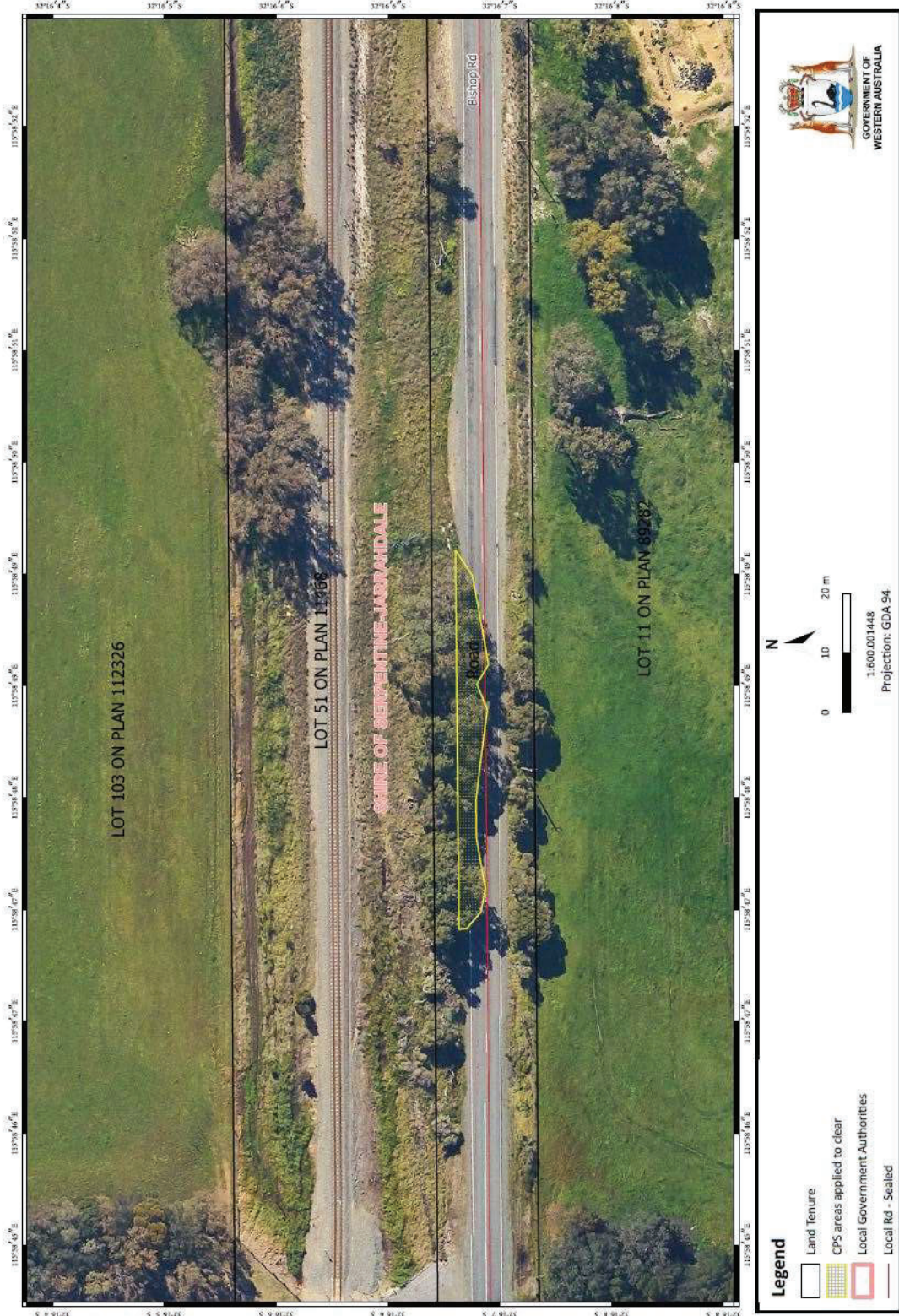


Figure 2: Map of the boundary of the area within which clearing may occur

9339/1 - Plan C

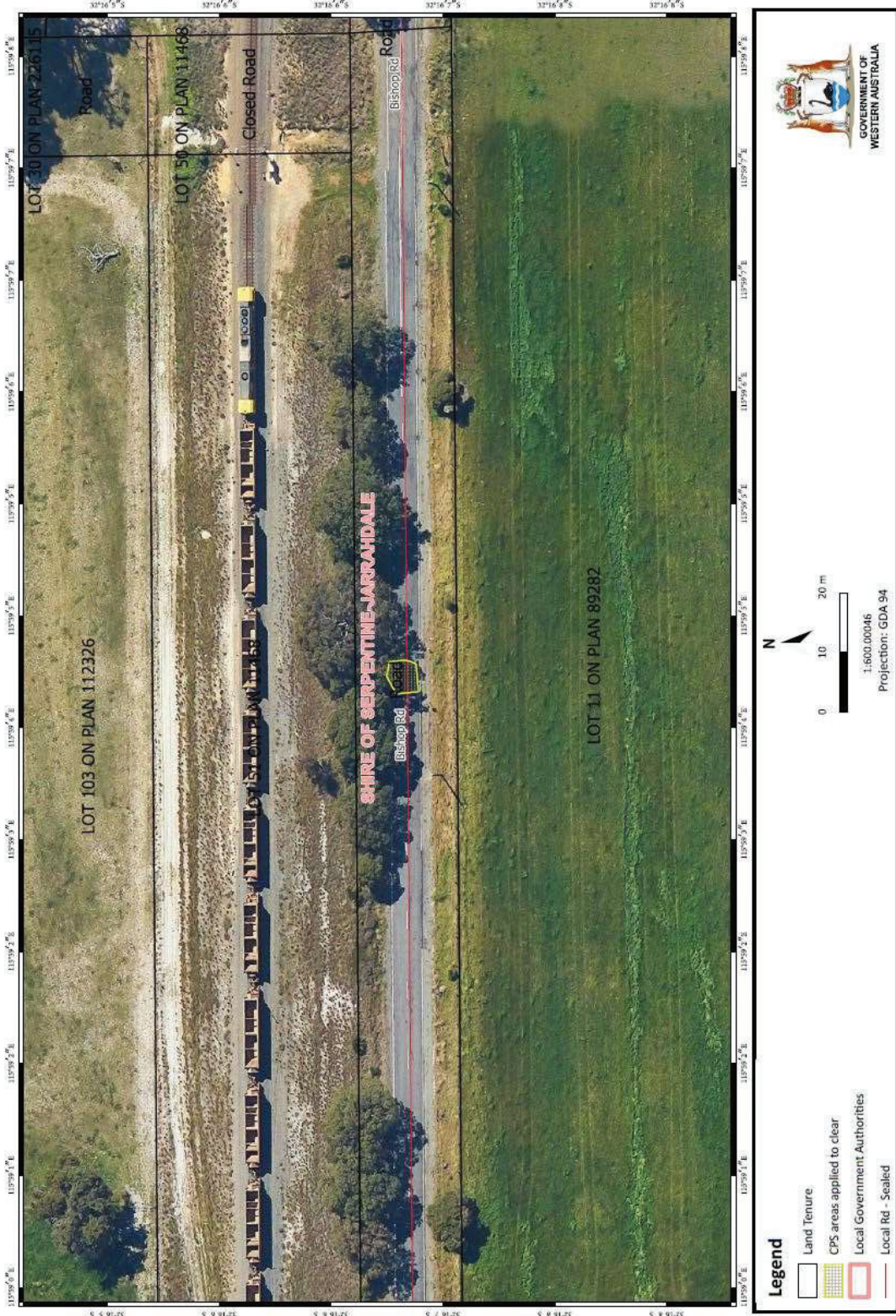


Figure 3: Map of the boundary of the area within which clearing may occur

9339/1 - Plan D



Figure 4: Map of the boundary of the area within which clearing may occur

9339/1 - Plan E



Figure 5: Map of the boundary of the area within which clearing may occur

9339/1 Plan F

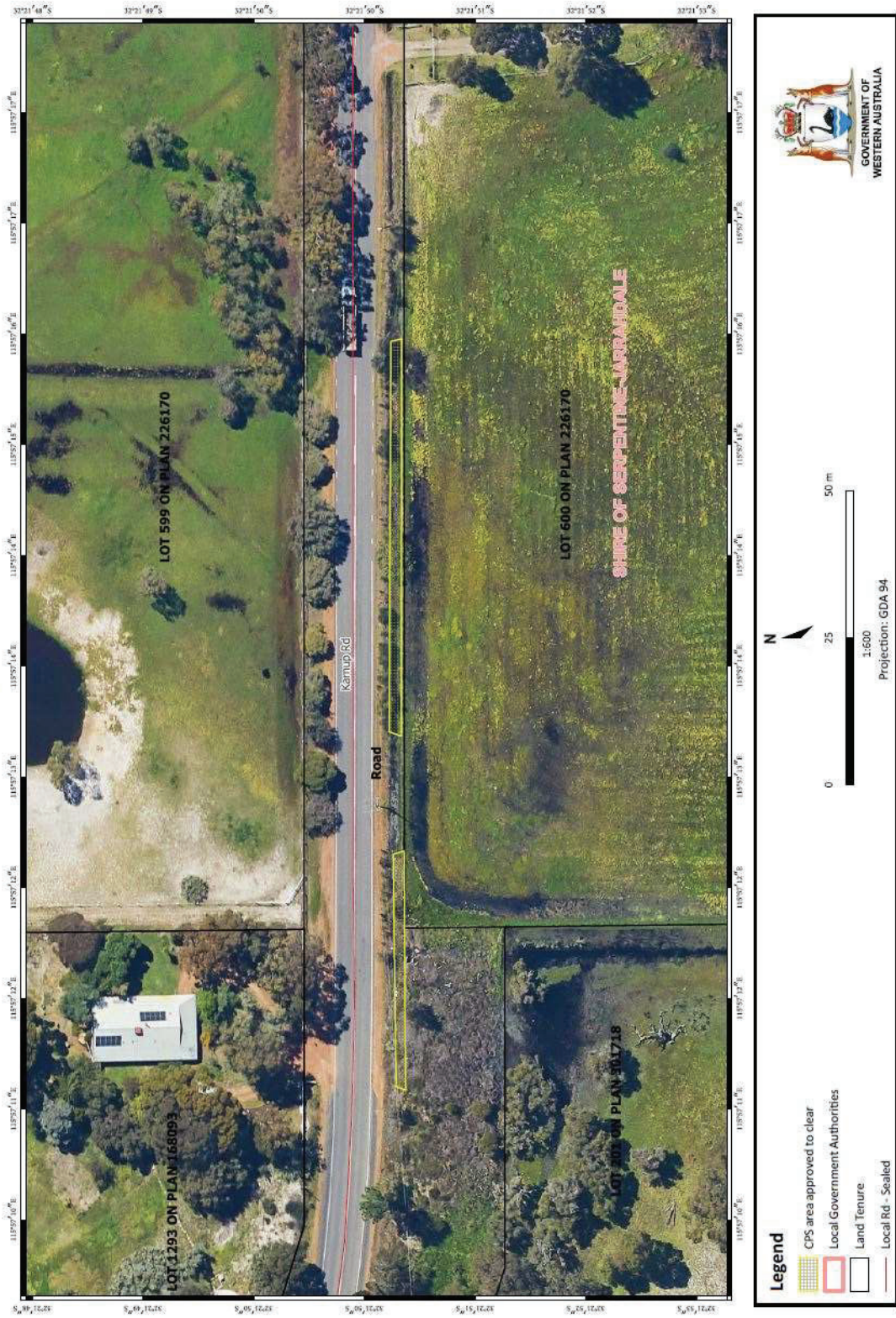
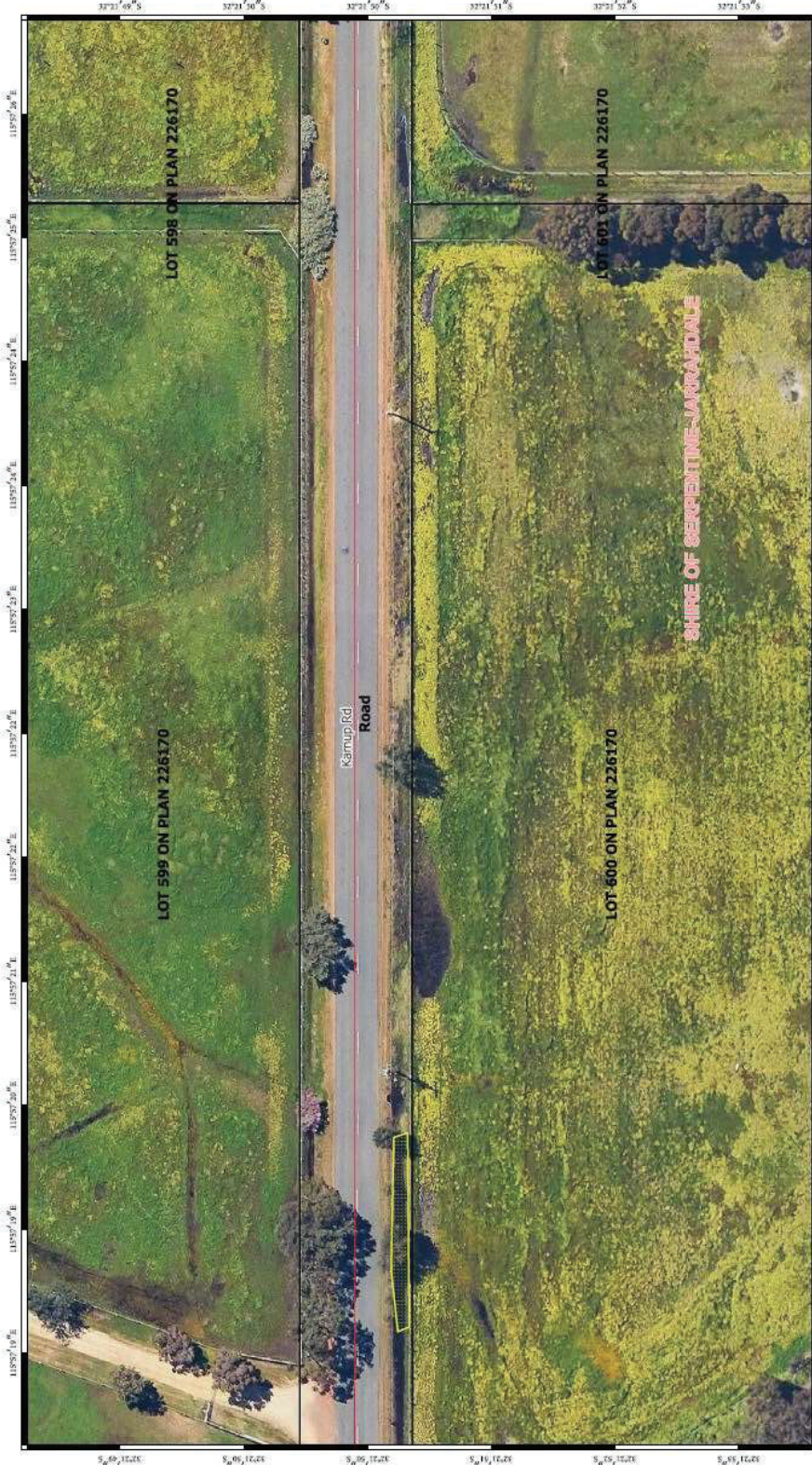


Figure 6: Map of the boundary of the area within which clearing may occur

9339/1 Plan G




Legend


- CPS area approved to clear
- Local Government Authorities
- Land Tenure
- Local Rd - Sealed



GOVERNMENT OF
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N



0 25 50 m

1:599,999354
Projection: GDA 94

Figure 7: Map of the boundary of the area within which clearing may occur

9339/1 Plan H

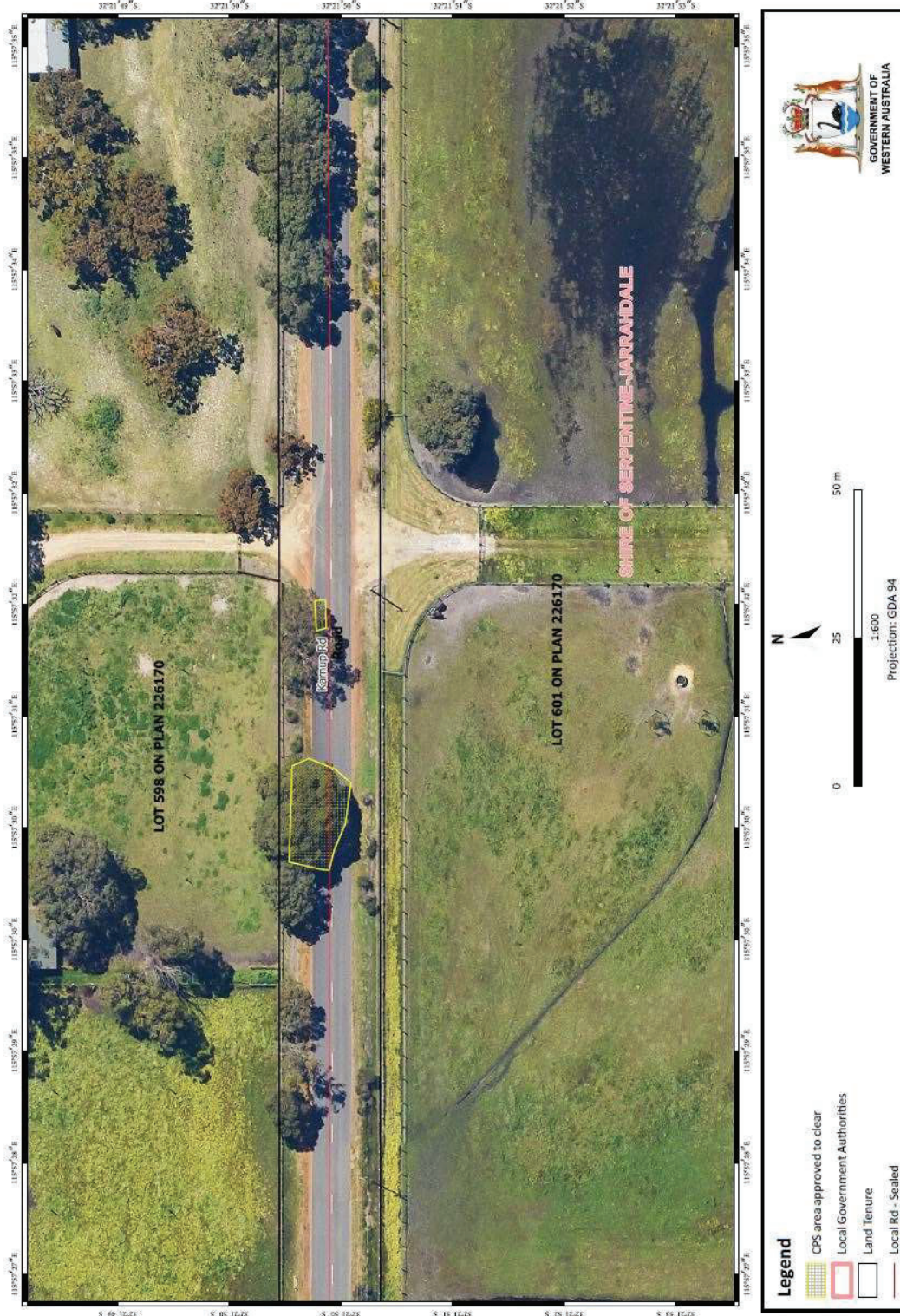


Figure 8: Map of the boundary of the area within which clearing may occur

9339/1 Plan I

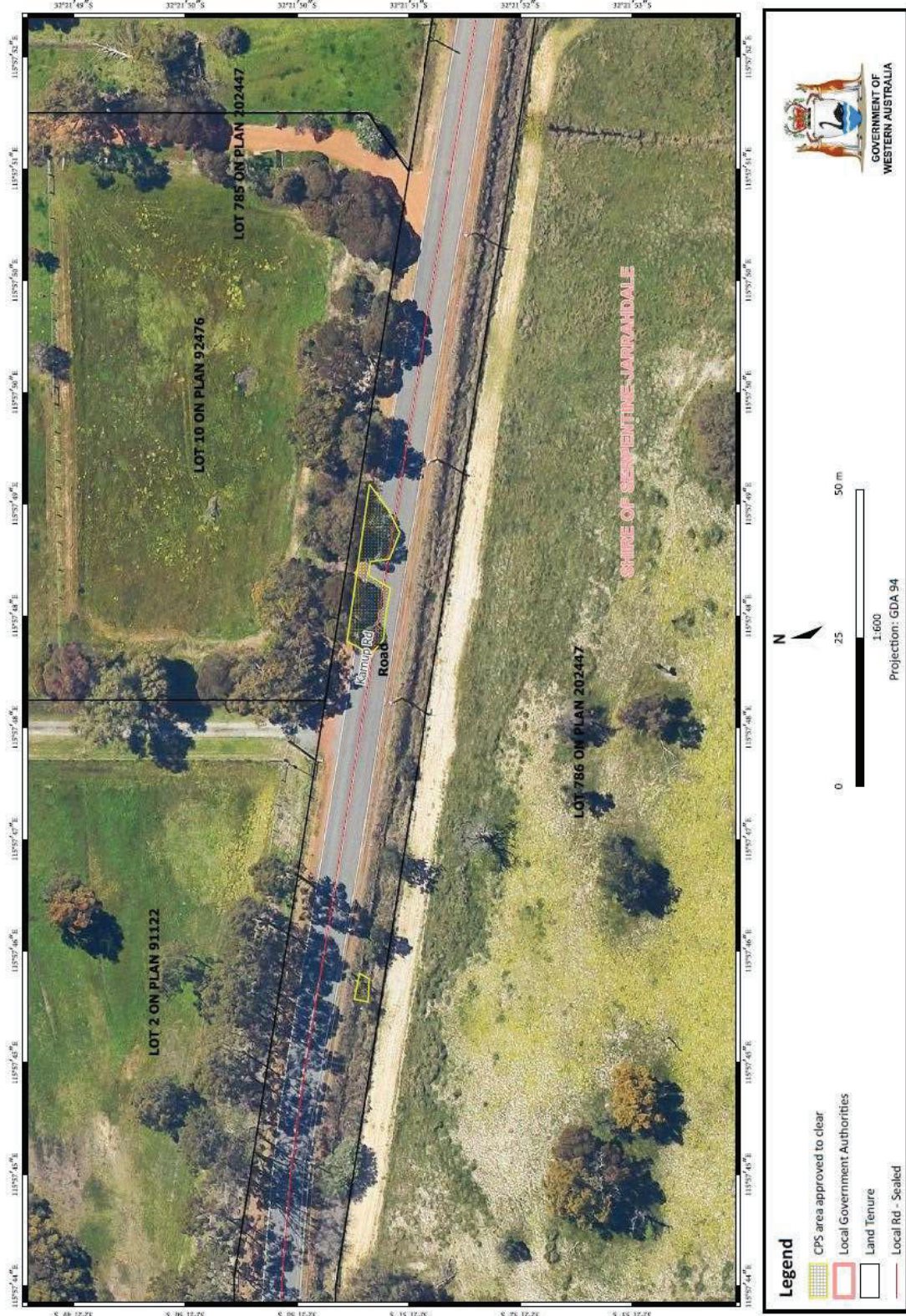


Figure 9: Map of the boundary of the area within which clearing may occur

9339/1 Plan J



Figure 10: Map of the boundary of the area within which clearing may occur

9339/1 Plan K



Figure 21: Map of the boundary of the area within which clearing may occur



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9339/1
Permit type:	Area permit
Applicant name:	Shire of Serpentine Jarrahdale
Application received:	24 June 2021
Application area:	0.188 hectares of native vegetation
Purpose of clearing:	Road construction and upgrades
Method of clearing:	Mechanical
Property:	Karnup Road (PINs 1372987 and 1372989) Bishop Road Reserves (PINs 1160722, 1160723, 11610724 and 11609323)
Location (LGA area/s):	Shire of Serpentine Jarrahdale
Localities (suburb/s):	Serpentine and Mundijong

1.2. Description of clearing activities

The vegetation proposed to be cleared includes sections of Bishop Road and Karnup Road, 10.4 kilometres to the south. Karnup road comprises 11 individual patches covering an area of 0.08 hectares. Bishop road comprises 13 individual patches covering an area of 0.108 hectares (see Figure 1-12, Section 1.5).

1.3. Decision on application

Decision:	Granted
Decision date:	22 May 2022
Decision area:	0.188 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed, and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix E.1), the findings of a flora / fauna survey (see Appendix D), the clearing principles set out in Schedule 5 of the EP Act (see Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the purpose of the proposed clearing is to improve road safety.

The assessment identified that the proposed clearing will result in:

- The loss of native vegetation that contains suitable foraging habitat for, *Calyptorhynchus latirostris* (Carnaby's cockatoo), *Calyptorhynchus baudinii* (Baudin's cockatoo) and *Calyptorhynchus banksii* subsp. *naso* (Forest red-tailed cockatoo).

The Delegated Officer considered that the loss of minimal foraging habitat within the application area was not significant due to limited extent of the clearing spread over a larger area and the degraded condition of the vegetation. Fauna individuals may be present at the time of clearing however.

After consideration of the available information, the Delegated Officer decided to grant a clearing permit subject to the following requirements conditioned on the clearing permit, to manage and address the impacts of clearing:

- Undertake slow, progressive clearing towards adjacent native vegetation, allowing terrestrial fauna to move into adjacent habitat ahead of the clearing activity.
- Take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

1.5. Site map



Figure 1 Context map of proposed clearing, red boxes contain the two main portions of the application area occurring on Bishop Road and Karnup Road to the south.

9339/1 - Plan A



Figure 2 Map of the application area, Plan A Bishop Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 - Plan B



Figure 3 Map of the application area, Plan B, Bishop Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 - Plan C

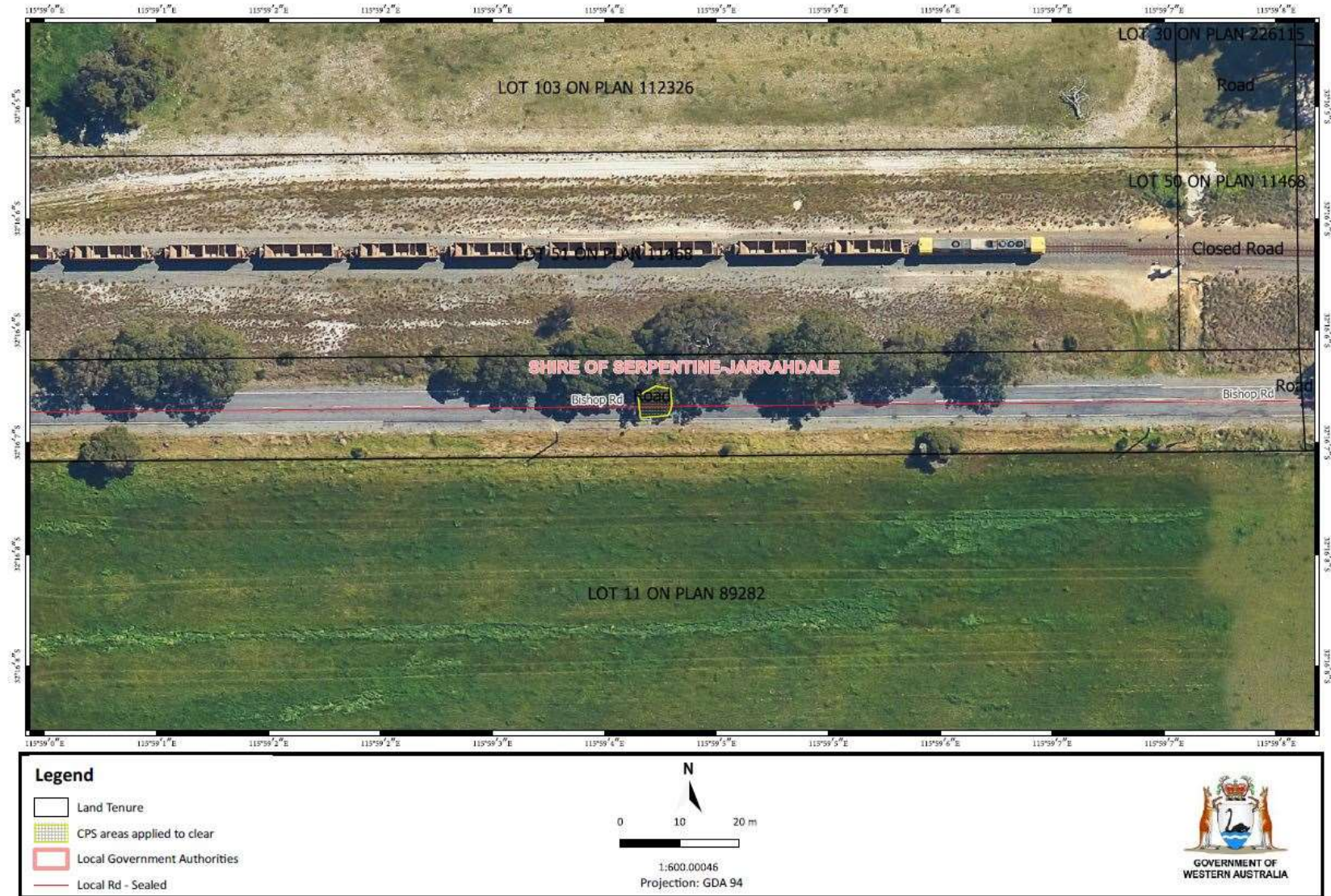


Figure 4 Map of the application area, Plan C, Bishop Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 - Plan D



Figure 5 Map of the application area, Plan D, Bishop Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 - Plan E



Figure 6 Map of the application area, Plan E, Bishop Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 Plan F



Figure 7 Map of the application area, Plan F, Karnup Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 Plan G

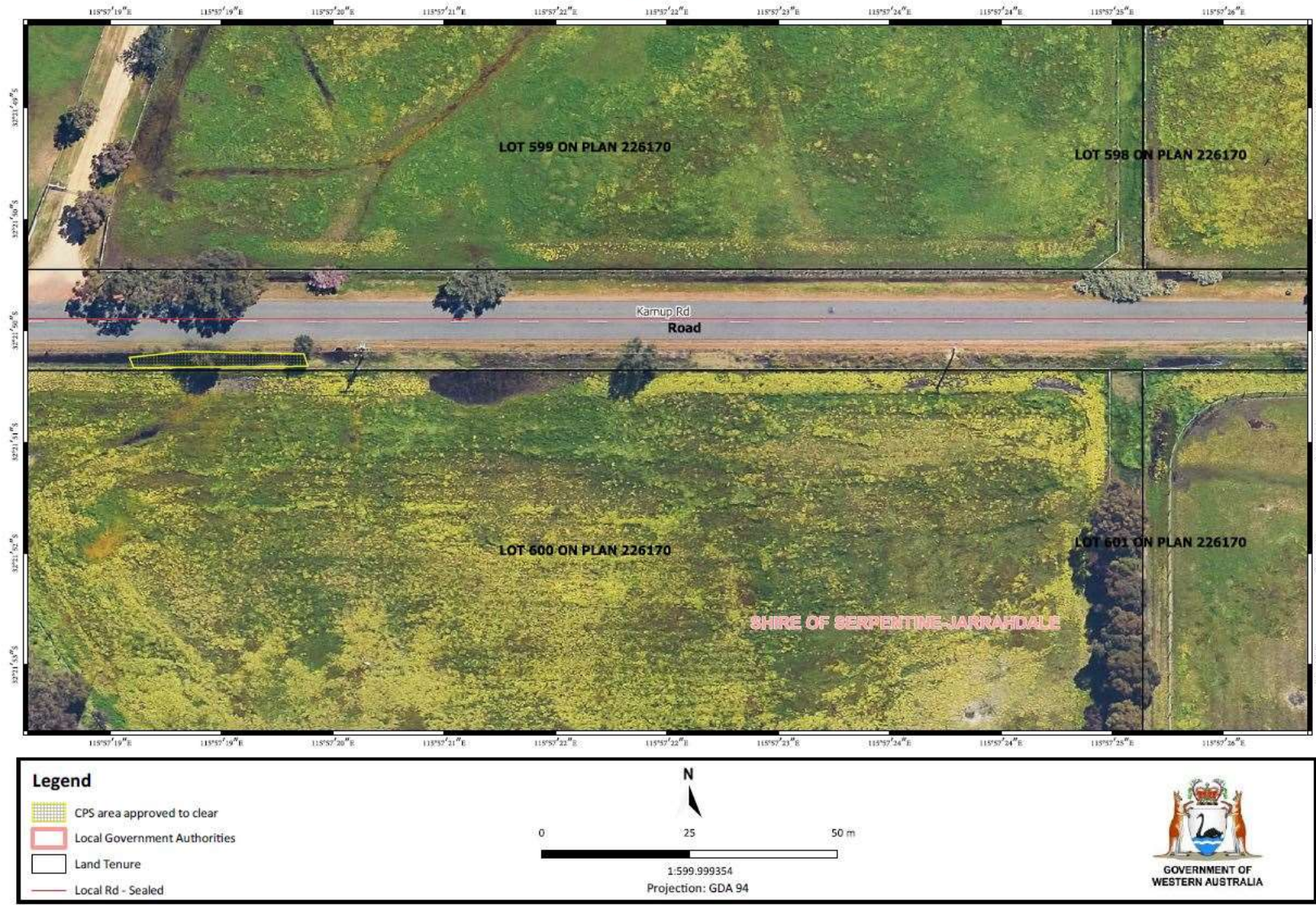


Figure 8 Map of the application area, Plan G Karnup Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 Plan H



Figure 9 Map of the application area, Plan H Karnup Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 Plan I

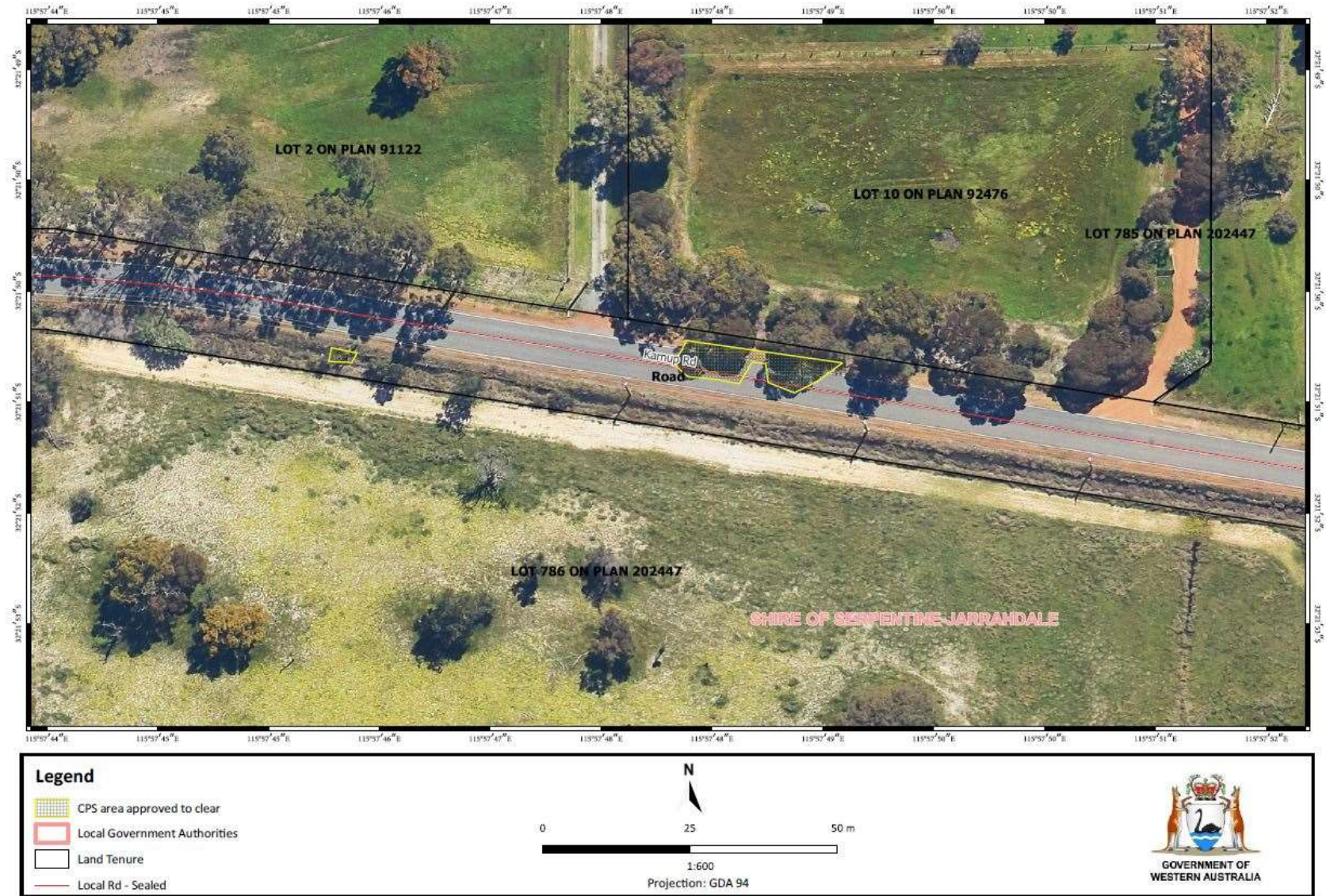


Figure 10 Map of the application area, Plan I Karnup Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 Plan J

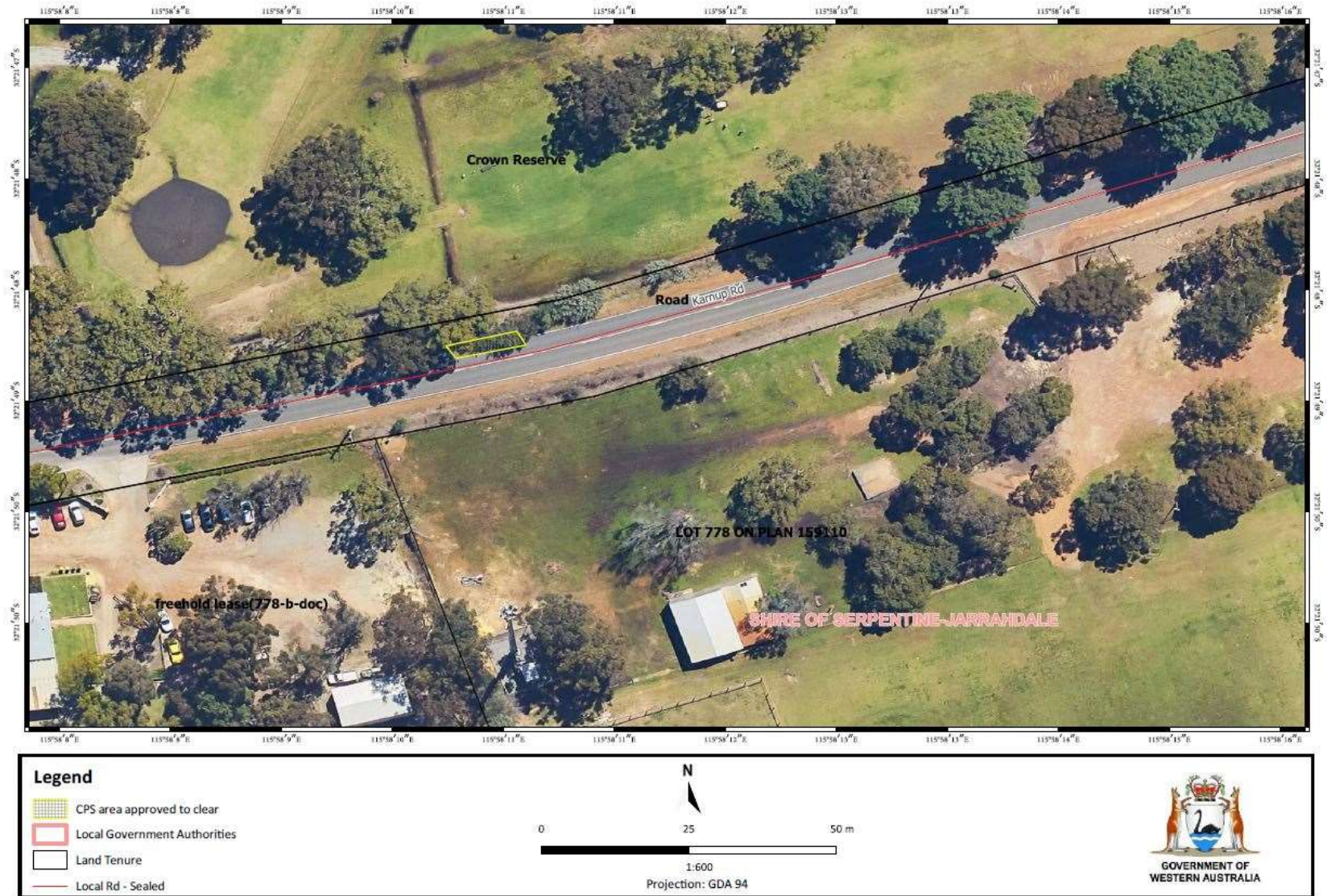


Figure 11 Map of the application area, Plan J Karnup Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

9339/1 Plan K



Figure 12 Map of the application area, Plan K Karnup Road. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2014)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *Environmental Offsets Guidelines* (August 2014)
- Detailed assessment of application

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The Shire of Serpentine-Jarrahdale advised that only those plant/trees that are too close to the road upgrade and table drain will be removed. The Shire will prioritise pruning to removal where possible (Shire of Serpentine Jarrahdale, 2021).

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix B) identified that the impacts of the proposed clearing may present a risk to biodiversity, fauna, and significant remnant vegetation. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1.1. *Biological values (biodiversity, threatened ecological community and threatened flora) - Clearing Principle (a, c and d)*

Assessment

According to available datasets, 46 priority flora and 10 threatened flora were recorded in the local area (Appendix A-3). Four threatened flora and six priority flora are recorded within 500 meters of the application area. Approximately 0.002 hectares of the south western end of the Karnup Road section is mapped as the 'Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region', listed as Priority 3 Priority Ecological Community (PEC) by the Department of Biodiversity, Conservation and Attractions (DBCA) and federally listed as Endangered Threatened Ecological Community (TEC). The Approved Conservation Advice for the TEC states that to be considered representative of the TEC, a remnant in the Swan Coastal Plain bioregion must include at least one of four key species—*Banksia attenuata* (candlestick banksia), *Banksia. menziesii* (firewood banksia), *Banksia. prionotes* (acorn banksia) and/or *Banksia. ilicifolia* (holly-leaved banksia), must include an emergent tree layer often including marri, jarrah, or tuart, and other medium trees including *Eucalyptus tottiana* (pricklybark), *Nuytsia floribunda* (WA Christmas tree), western sheoak, *Callitris arenaria* (sandplain cypress), *Callitris pyramidalis* (swamp cypress) or *Xylomelum occidentale* (woody pear) and must include an often highly species-rich understorey (Threatened Species Scientific Committee, 2016).

A targeted flora survey carried out in September 2021 (Emerge 2021) did not identify any threatened or Priority flora in the application area. The survey (Emerge 2021) did not identify any vegetation assemblage that would indicate any of the TECs or PECs recorded in the local area. The targeted survey (Emerge 2021) noted the vegetation within the application area had been subject to ground disturbance and weed invasion, with most of the understory dominated by non-native shrubs, herbs, and grasses. Images provided by the applicant (Shire of Serpentine Jarrahdale, 2021) confirm the vegetation within the application area is in degraded (Keighery, 1994) to completely degraded (Keighery, 1994) condition, comprised mostly of *Corymbia calophylla* (marri)- *Eucalyptus marginata* (Jarrah) trees less than 500 millimetres diameter at breast height (DBH) and with an understory comprising of introduced species. Given the degraded nature of the application and the lack of a number of key indicator species as outlined above, the proposed clearing is unlikely to include the Banksia Dominated Woodlands TEC, or any of the threatened and priority flora as listed in occurring in the local area.

Conclusion

The vegetation in the application area is comprised of regrowth vegetation in degraded to completely degraded condition. The proposed clearing is unlikely to provide habitat for threatened and priority flora. The proposed clearing does not include key species that would indicate a TEC or PEC.

Conditions

The applicant will be required to implement weed and dieback management measures to mitigate impacts to adjacent vegetation.

3.2.2. Biological values (fauna) - Clearing Principle (b)

Assessment

Black Cockatoo

According to available datasets, *Calyptorhynchus latirostris* (Carnaby's cockatoo), *Calyptorhynchus baudinii* (Baudin's cockatoo), and *Calyptorhynchus banksii naso* (Forest red-tailed black cockatoo) have been recorded within 0.03, 0.07 and 0.35 kilometres from the application area respectively.

Forty two black cockatoo roosts have been recorded within the local area. Black cockatoo roost sites are usually located in the tallest trees within a landscape, and in proximity to a food and water supply (Commonwealth of Australia, 2017). Black cockatoo flocks will utilise different roosts, often for weeks, or until the local food supply is exhausted. Black cockatoo flocks show some consistency in roost site preference, with sites used in most years to access high-quality feeding sites. However, not all roosts are used in every year (DPAW, 2013). Foraging resources within six kilometres, and up to 12 kilometres of roost sites are important to sustain populations (Commonwealth of Australia 2017). The nearest roost is recorded 0.34 kilometres from the application area, however the vegetation proposed to be cleared does not include the tallest trees in the local area and therefore roosting habitat is unlikely to be impacted. According to images provided by the applicant (see Appendix D), the application area does include Marri and Jarrah trees that would provide foraging habitat for black cockatoos. Given the limited extent of the clearing, it is unlikely to significantly impact foraging and roosting habitat for black cockatoo species utilising the roosts in the local area.

Eleven black cockatoo breeding sites, mostly confined to the woodlands of the Darling scarp are recorded in the local area, with the nearest breeding site at 1.80 kilometres east of the application area. Suitable breeding habitat for black cockatoo include trees which either have a suitable nest hollow, or of a suitable DBH to develop a nest hollow. For most tree species, including jarrah and marri trees, a DBH of at least 500 millimetres is required to develop hollows of suitable size for use by black cockatoo (Commonwealth of Australia, 2012). The images supplied by the applicant (see Appendix D) and aerial imagery (see site maps, Section 1.5) indicate the application area is unlikely to include trees with a suitable DBH. The proposed clearing is not considered to impact black cockatoo breeding habitat.

The application area comprises part of a mapped Perth regional ecological linkage (Malloy *et al*, 2009). The linkage will not be severed, as native vegetation will remain within the road reserve that may be utilised by ground dwelling fauna.

Fauna recorded in the local area, such as, *Phascogale tapoatafa wambenger* (south-western brush-tailed phascogale), *Dasyurus geoffroyi* (Chuditch), *Pseudocheirus occidentalis* (Western ringtail possum), and *Falsistrellus mackenziei* (Western false pipistrelle, western falsistrelle), may range through the application area as they forage. However, due to the limited number of trees, their trunk size and proximity to the road, the application area is unlikely to contain breeding habitat for arboreal species.

The proposed clearing may also impact habitat for ground dwelling conservation significant fauna, such as *Isoodon fusciventer* (Quenda), *Setonix brachyurus* (Quokka), *Ctenotus delli* (Dell's skink), *Lerista lineata* (Perth slider, lined skink) and *Acanthophis antarcticus* (southern death adder), as it is possible the home range of the above species

could include the application area. Given the limited extent of the clearing (0.188 hectares), the degraded nature of the vegetation, and the availability of more extensive, higher quality vegetation associated with the Darling Scarp in the eastern section of the local area, the proposed clearing is unlikely to significantly impact the function of a regional ecological linkage and available habitat for the above species.

Conclusion

Based on the above assessment, given the small size of the proposed clearing and the availability of suitable habitat in better condition with the adjacent vegetation, the proposed clearing will not result in a significant loss of habitat for the above fauna species. The potential direct impact to fauna present at the time of clearing may be managed by the implementation of a fauna management condition. Weed and dieback management will also assist in ensuring that the adjacent fauna habitat is not impacted by the proposed clearing.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit.

- Requiring the permit holder to conduct directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity.
- Implement weed and dieback management measures to mitigate impacts to adjacent vegetation.

3.2.3. Biological values (extensively cleared) - Clearing Principle (e)

Assessment

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750 (i.e. pre-European settlement) (Commonwealth of Australia 2001). This is the threshold level below which species loss appears to accelerate exponentially at an ecosystem level. The local area retains approximately 33.40 per cent of its pre-European native vegetation extent.

According to available datasets, two of the five vegetation types mapped with the application area retain less than 10 per cent of their Pre-European extent, these include the Guildford Complex at 5.09 per cent and the Beermullah Complex at 6.67 percent. Images provided by the Applicant (Shire of Serpentine Jarrahdale, 2021) and historical aerial imagery indicate that the vegetation is regrowth. Given the condition of the vegetation and the 0.188 hectares of clearing that is comprised of 24 separate areas spread out over 4.5 kilometres of road reserve, the proposed clearing is unlikely to result in a loss of significant species or ecosystem functioning.

Conclusion

Based on the above assessment, the proposed clearing is of limited extent and is unlikely to include vegetation representative of a highly cleared vegetation complex.

Conditions

No conditions required.

3.3. Relevant planning instruments and other matters

A portion at the eastern end of the application area on Kernup Road, has been mapped as a place of aboriginal heritage (see Figure 12). It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972 (WA)* and ensure that no Aboriginal Sites of Significance are not damaged through the clearing process.

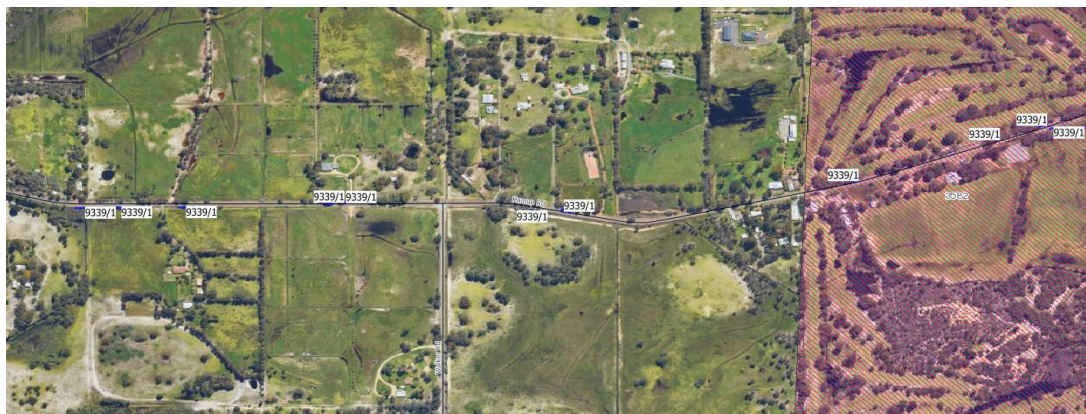


Figure 13 Pink hashed areas indicate an Aboriginal heritage site associated with the Serpentine River. The area has Ceremonial and Mythological significance.

End

Appendix A. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of the assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix B.

A.1. Site characteristics

Characteristic	Details
Local context	<p>The clearing area represents regrowth from previous clearing of remanent vegetation within a road reserve. The local area is categorised by scattered patches of native vegetation connected by road reserves, rail reserves and riparian zones.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 33.401 per cent of the original native vegetation cover.</p>
Ecological linkage	The eastern portion of Bishop Road and Karnup Road clearing areas are mapped as a Perth regional ecological linkage.
Conservation areas	<p>Conservation areas nearest to Bishop Road include:</p> <ul style="list-style-type: none"> • Unnamed nature reserve 1.9 north • Unnamed nature reserve 2.7 kilometres south. • Unnamed nature reserve 8 kilometres west • Jarrahdale State Forest 3.6 east <p>Conservation areas nearest to Karnup Road include:</p> <ul style="list-style-type: none"> • Unnamed nature reserve 0.17 kilometres east. • Serpentine National Park 2.9 kilometres east • Unnamed nature reserve 3 kilometres west
Vegetation description	<p>Photographs supplied by the Applicant (Shire of Serpentine Jarrahdale 2021) and floristic survey (Emerge 2021) indicate the vegetation within the proposed clearing area is regrowth and planted vegetation consisting of:</p> <ul style="list-style-type: none"> • Bishop Road: mixed non-native <i>Eucalyptus</i> species scattered through <i>Corymbia calophylla</i> (Marri), <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah) woodland with <i>Allocasuarina fraseriana</i> (Sheoak) becoming more dominate in wetter areas. • Karnup Road: <i>Corymbia calophylla</i> (Marri) and <i>Eucalyptus marginata</i> (Jarrah) woodland. <p>This is partially consistent with the mapped Swan Coastal Plain vegetation complexes as described and mapped by Heddlé et al. (1980) as updated by Webb et al. (2016):</p> <ul style="list-style-type: none"> • Beermullah Complex, which is described as, mixture of low open forest of <i>Casuarina obesa</i> (Swamp Sheoak) and open woodland of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah). Minor components include closed scrub of <i>Melaleuca</i> species and occurrence of <i>Callitris pyramidalis</i> (Swamp Cypress). • Forrestfield Complex, which is described as vegetation ranges from open forest of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah) to open forest of <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri) - <i>Allocasuarina fraseriana</i> (Sheoak) - <i>Banksia</i> species. Fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) in the gullies that dissect this landform. • Guildford Complex, which is described as, a mixture of open forest to tall open forest of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah) and woodland of <i>Eucalyptus wandoo</i> (Wandoo) (with rare occurrences of <i>Eucalyptus lane-poolei</i> (Salmon White Gum)). Minor components include <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark).

Characteristic	Details
	<ul style="list-style-type: none"> Southern River Complex which is described as, open woodland of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus marginata</i> (Jarrah) - <i>Banksia</i> species with fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark) along creek beds. <p>Representative photos are available in Appendix D.</p>
Vegetation condition	<p>Photographs supplied by the applicant (Shire of Serpentine Jarrahdale 2021) indicate the vegetation within the proposed clearing area is in a degraded (Keighery, 1994) to completely degraded (Keighery, 1994) condition.</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix C. Representative photos are available in Appendix D.</p>
Climate	<ul style="list-style-type: none"> Mean annual rainfall: 858.7 millimetres Temperature (mean annual minimum): 24.0 degrees centigrade Temperature (mean annual maximum): 20.2 degrees centigrade
Soil description and landform	<p>The soil is mapped as (Schoknecht et al. 2013):</p> <ul style="list-style-type: none"> Bassendean B2 Phase: Flat to very gently undulating sandplain with well to moderately well drained deep bleached grey sands with a pale yellow B horizon or a weak iron-organic hardpan 1-2 m. Bassendean B4 Phase: Broad poorly drained sandplain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5 m by clay or less frequently a strong iron-organic hardpan. Forrestfield F2b Phase: Low slopes and foot slopes up to 5-10% with well drained moderately deep to deep, gravelly acidic yellow duplex soils and rare laterite. Pinjarra P2 Phase: Flat to very gently undulating plain with deep alkaline mottled yellow duplex soils which generally consist of shallow pale sand to sandy loam over clay. Pinjarra P3 Phase: Flat to very gently undulating plain with deep, imperfect to poorly drained acidic gradational yellow or grey-brown earths and mottled yellow duplex soils, with loam to clay loam surface horizons. Pinjarra P8 Phase: Broad poorly drained flats and poorly defined stream channels with moderately deep to deep sands over mottled clays; acidic or less commonly alkaline gley and yellow duplex soils to uniform bleached or pale brown sands over clay. <p>Landforms within the application area are described as:</p> <ul style="list-style-type: none"> Swan Coastal Plain from Busselton to Jurien. Sand dunes and sandplains with pale deep sand, semi-wet and wet soil (eastern portion of Bishop Road). Swan Coastal Plain from Perth to Capel. Poorly drained coastal plain with variable alluvial and aeolian soils.
Land degradation risk	<p>Soil types mapped within the application area have a high variability of risk. All soils with the exception of Pinjarra P3 Phase, have a high to moderate risk of wind erosion. All soils except Pinjarra P8 and Forrestfield F2b Phase have low to moderate risk of water erosion and low to moderate risk of salinity. Subsurface Acidification was moderate to high for all soils, as is waterlogging with the exception of Forrestfield F2b Phase. Phosphorus export risk is variable, with Pinjarra P8 and Bassendean B2 Phase of high risk, and Bassendean B4 low to moderate.</p>
Waterbodies	<p>The desktop assessment and aerial imagery indicated that the application area falls within the geomorphic wetlands of the Swan Coastal Plain, with Bishop and Karnup Road classified as a Palusplain and dampland respectively.</p>
Hydrogeography	<p>Karnup Road portion of the application area falls within a RIWI Act, Surface Water Area, for the Serpentine River System. Both sections of the application area fall within the Serpentine Groundwater Area under the RIWI Act.</p>

Characteristic	Details																					
Flora	<p>The local area includes 10 Threatened flora and 46 Priority flora. The nearest conservation significant flora species to the proposed clearing is the Threatened <i>Synaphea</i> sp. Serpentine (G.R. Brand 103). See Section A3 for a flora habitat suitability analysis of conservation significant flora recorded in the local area.</p> <p>A number of conservation significant flora associated with habitat types that do not occur within the application area are listed below (Western Australian Herbarium 1998-). :</p> <ul style="list-style-type: none"> • Species associated with granite outcrops, <ul style="list-style-type: none"> ○ <i>Acacia oncinophylla</i> subsp. <i>patulifolia</i> (P4) ○ <i>Anthocercis gracilis</i> (Threatened) ○ <i>Lasiopetalum pterocarpum</i> (Threatened) • Species associated with Riparian habitats: <ul style="list-style-type: none"> ○ <i>Eucalyptus rudis</i> subsp. <i>cratyantha</i> (P4) ○ <i>Dillwynia dillwynioides</i> (P2) ○ <i>Parsonsia diaphanophleba</i> (P1) • Species associated with semi aquatic and sim-aquatic habitats, <ul style="list-style-type: none"> ○ <i>Aponogeton hexatepalus</i> (P4), ○ <i>Meionectes tenuifolia</i> (P3), ○ <i>Schoenus capillifolius</i> (P3) <p>Conservation significant fungi were also recorded in the local area, These include <i>Amanita wadjukiorum</i> (P3), <i>Amanita wadulawitu</i> (P2), <i>Amanita carneiphylla</i> (P3), <i>Amanita fibrillopes</i> (P3) and <i>Amanita kalamundae</i> (P3).</p>																					
Ecological communities	<p>Approximately 0.002 hectares of the southern western end of the Karnup Road section is mapped as the TEC 'Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region', listed as state listed as Priority 3 and federally listed as Endangered.</p> <p>Other threatened and Priority ecological communities mapped in the local area are listed in the table below:</p> <table border="1" data-bbox="427 1144 1471 1968"> <thead> <tr> <th data-bbox="432 1151 1034 1191">Ecological community</th> <th data-bbox="1034 1151 1241 1191">State listing</th> <th data-bbox="1241 1151 1466 1191">Federal Listing</th> </tr> </thead> <tbody> <tr> <td data-bbox="432 1191 1034 1339"><i>Banksia attenuata</i> and/or <i>Eucalyptus marginata</i> woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. (1994)).</td> <td data-bbox="1034 1191 1241 1339">Endangered.</td> <td data-bbox="1241 1191 1466 1339">-</td> </tr> <tr> <td data-bbox="432 1339 1034 1424">Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain</td> <td data-bbox="1034 1339 1241 1424">Critically Endangered</td> <td data-bbox="1241 1339 1466 1424">Endangerer</td> </tr> <tr> <td data-bbox="432 1424 1034 1572"><i>Corymbia calophylla</i> - <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al. (1994))</td> <td data-bbox="1034 1424 1241 1572">Vulnerable</td> <td data-bbox="1241 1424 1466 1572">-</td> </tr> <tr> <td data-bbox="432 1572 1034 1720"><i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))</td> <td data-bbox="1034 1572 1241 1720">Critically Endangered</td> <td data-bbox="1241 1572 1466 1720">Endangerer</td> </tr> <tr> <td data-bbox="432 1720 1034 1832">Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. (1994))</td> <td data-bbox="1034 1720 1241 1832">Vulnerable</td> <td data-bbox="1241 1720 1466 1832">Critically Endangered</td> </tr> <tr> <td data-bbox="432 1832 1034 1968">Forests and woodlands of deep seasonal wetlands of the Swan Coastal Plain (floristic community type 15 as originally described in Gibson et al. (1994))</td> <td data-bbox="1034 1832 1241 1968">Vulnerable</td> <td data-bbox="1241 1832 1466 1968">-</td> </tr> </tbody> </table>	Ecological community	State listing	Federal Listing	<i>Banksia attenuata</i> and/or <i>Eucalyptus marginata</i> woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. (1994)).	Endangered.	-	Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain	Critically Endangered	Endangerer	<i>Corymbia calophylla</i> - <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al. (1994))	Vulnerable	-	<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))	Critically Endangered	Endangerer	Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. (1994))	Vulnerable	Critically Endangered	Forests and woodlands of deep seasonal wetlands of the Swan Coastal Plain (floristic community type 15 as originally described in Gibson et al. (1994))	Vulnerable	-
Ecological community	State listing	Federal Listing																				
<i>Banksia attenuata</i> and/or <i>Eucalyptus marginata</i> woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. (1994)).	Endangered.	-																				
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<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))	Critically Endangered	Endangerer																				
Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. (1994))	Vulnerable	Critically Endangered																				
Forests and woodlands of deep seasonal wetlands of the Swan Coastal Plain (floristic community type 15 as originally described in Gibson et al. (1994))	Vulnerable	-																				

Characteristic	Details		
	Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson et al. (1994))	Vulnerable	Critically Endangered
	Low lying <i>Banksia attenuata</i> woodlands or shrublands	Priority 3	Endangerer
	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994))	Endangerer	Critically Endangered
	Southern wet shrublands, Swan Coastal Plain (floristic community type 2 as originally described in Gibson et al. (1994))	Endangerer	-
Fauna	<p>A total of 33 conservation significant fauna are recorded in the local area. The nearest record is for <i>Calyptorhynchus latirostris</i> (Carnaby's cockatoo) approximately 0.036 kilometres from the application area.</p> <p>The local area includes 50 unspecified records for white-tailed black cockatoo, the nearest at 1.8 kilometres from the application area. Black cockatoo habitat within the local area includes:</p> <ul style="list-style-type: none"> • Eight white tailed black cockatoo breeding sites occur in the local area the nearest is 1.80 kilometres northeast of the application area (Karnup Road). • Three red tailed black cockatoo breeding sites occur in the local area the nearest is 8.20 kilometres northeast of the application area (Karnup Road). • A total of 42 black cockatoo roosts sites. The nearest is 0.34 kilometres north-east of the application area(Karnup Road). • Approximately 90 per cent of all remnant vegetation in the local area, is mapped as cockatoo feeding habitat. <p>Habitat suitability analysis is provided in table A.3. A number of fauna species dependent on marine and freshwater habitats have been omitted from the table as these species are highly unlikely to utilise the habitats within the application area.</p>		

A.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
**IBRA bioregion					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	38.45	14.85
Jarrah Forest	4,506,660.25	2,399,838.15	53.25	69.74	37.14
*Vegetation complex					
Southern River Complex	58781.48	10832.17	18.43	940.36	1.60
Guildford Complex	90513.13	4607.91	5.09	287.49	0.32
Forrestfield Complex	22812.92	2803.35	12.29	381.57	1.67
Beermullah Complex	6707.27	447.21	6.67	142.62	2.13
Local area					
10 km radius	57381.94	19163.37	33.40	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

A.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	Y	Y	Y	0.12	55	Y
<i>Drosera occidentalis</i>	P4	Y	Y	N	0.19	3	Y
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	T	Y	Y	Y	0.27	8	Y
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	P2	Y	Y	Y	0.3	13	Y
<i>Acacia oncinophylla</i> subsp. <i>oncinophylla</i>	P3	N	N	N	0.34	2	Y
<i>Morelotia australiensis</i>	T	Y	Y	Y	0.39	9	Y
<i>Acacia horridula</i>	P3	Y	N	N	0.40	23	Y
<i>Verticordia plumosa</i> var. <i>ananeotes</i>	T	Y	Y	N	0.40	2	Y
<i>Senecio leucoglossus</i>	P4	Y	Y	N	0.40	2	Y
<i>Isopogon autumnalis</i>	P3	N	Y	N	0.40	2	Y
<i>Calectasia grandiflora</i>	P2	N	N	N	0.53	4	Y
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	T	Y	Y	Y	0.54	23	Y
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	P1	Y	N	N	0.62	5	Y
<i>Synaphea odocoileops</i>	P1	N	N	N	0.79	1	Y
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4	Y	Y	N	1.04	7	Y
<i>Caladenia huegelii</i>	T	N	N	N	1.21	7	Y
<i>Eryngium pinnatifidum</i> subsp. <i>palustre</i> (G.J. Keighery 13459)	P3	Y	N	N	1.23	11	T
<i>Drakaea elastica</i>	T	N	Y	Y	1.17	5	Y
<i>Babingtonia urbana</i>	P3	Y	Y	N	2.50	9	Y
<i>Lepidosperma rostratum</i>	T	N	Y	N	3.35	8	Y
<i>Diuris purdiei</i>	T	N	N	N	3.48	4	Y
<i>Jacksonia gracillima</i>	P3	Y	Y	N	3.51	3	Y
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)	P3	Y	Y	N	3.79	1	Y
<i>Angianthus drummondii</i>	P3	N	N	N	3.79	1	Y
<i>Lasiopetalum glutinosum</i> subsp. <i>glutinosum</i>	P3	N	N	N	3.82	3	Y
<i>Stylidium aceratum</i>	P3	Y	Y	N	3.89	1	Y

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Millotia tenuifolia</i> var. <i>laevis</i>	P2	N	Y	N	4.30	3	Y
<i>Schoenus pennisetis</i>	P3	N	N	N	4.3	4	Y
<i>Pithocarpa corymbulosa</i>	P3	Y	Y	N	4.73	3	Y
<i>Carex tereticaulis</i>	P3	Y	N	N	5.17	1	Y
<i>Thysanotus anceps</i>	P3	Y	Y	N	6.50	1	Y
<i>Halgania corymbosa</i>	P3	Y	Y	N	6.50	1	Y
<i>Pimelea rara</i>	P4	Y	Y	N	6.59	3	Y
<i>Lepyrodia heleocharoides</i>	P3	N	Y	N	7.75	1	Y
<i>Cyanothamnus tenuis</i>	P4	Y	Y	N	7.75	1	Y
<i>Pimelea rara</i>	P4	Y	Y	N	6.59	3	Y
<i>Hibbertia acrotoma</i>	P1	N	Y	N	7.42	1	Y
<i>Stylidium longitubum</i>	P4	N	N	N	8.00	6	Y
<i>Drosera oreopodion</i>	P1	Y	Y	Y	9.12	3	Y
<i>Cyathochaeta teretifolia</i>	P3	Y	N	N	9.39	1	Y
<i>Boronia juncea</i> subsp. <i>juncea</i>	P1	Y	N	N	9.39	1	Y
<i>Banksia kippistiana</i> var. <i>paenepeccata</i>	P3	N	N	N	9.45	1	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Calyptorhynchus latirostris</i> (Carnaby's cockatoo)	EN	Y	Y	0.03	634	Y
<i>Calyptorhynchus baudinii</i> (Baudin's cockatoo)	EN	Y		0.07	177	Y
<i>Isodon fusciventer</i> (Quenda, southwestern brown bandicoot)	P4	Y	Y	0.13	186	Y
<i>Calyptorhynchus banksii naso</i> (Forest red-tailed black cockatoo)	VU	Y	Y	0.35	207	Y
<i>Dasyurus geoffroyi</i> (Chuditch, western quoll)	VU	N	N	0.4	26	Y
<i>Phascogale tapoatafa wambenger</i> (South-western brush-tailed phascogale, wambenger)	CD	N	N	1.50	16	Y
<i>Falco peregrinus</i> (peregrine falcon)	OS	N	N	1.5	7	Y

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Euoplos inornatus</i> (inornate trapdoor spider (northern Jarrah Forest))	P3	N	N	1.7	1	Y
<i>Setonix brachyurus</i> (Quokka)	VU	N	N	N	18	Y
<i>Idiosoma sigillatum</i> (Swan Coastal Plain shield-backed trapdoor spider)	P3	N	Y	3.48	1	Y
<i>Acanthopis antarcticus</i> (southern death adder)	P3	N	N	3.94	16	Y
<i>Myrmecobius fasciatus</i> (numbat, walpurti)	EN	N	N	4.05	6	Y
<i>Falsistrellus mackenziei</i> (Western false pipistrelle, western falsistrelle)	P4	Y	Y	5.22	6	Y
<i>Notamacropus eugenii</i> derbianus (tammar wallaby)	P4	N	N	5.39	1	Y
<i>Notamacropus irma</i> (Western brush wallaby)	P4	N	N	5.7	7	Y
<i>Leipoa ocellata</i> (malleefowl)	VU	N	N	6.42	2	Y
<i>Ctenotus delli</i> (Dell's skink, Darling Range Southwest Ctenotus)	P4	N	N	7.61	1	Y
<i>Lerista lineata</i> (Perth slider, lined skink)	P3	y	N	7.96	4	Y
<i>Pseudocheirus occidentalis</i> (western ringtail possum, ngwayir)	CR	N	N	9.97	1	Y
<i>Synemon gratiosa</i> (Graceful sunmoth)	P4	N	N	9.97	!	

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, conservation dependent, white-tailed black cockatoo 50 records

A.5. Land degradation risk table

Risk categories	Bassendean B2 Phase	Bassendean B4	Forrestfield F2b Phase	Pinjarra P8 Phase:	Pinjarra P3 Phase	Pinjarra P8
Wind erosion	30-50%	10-30%	>70%	3-10%	<3%	>70%
Water erosion	<3%	<3%	<3%	<3%	<3%	<3%
Salinity	<3%	<3%	<3%	30-50%	3-10%	3-10%
Subsurface Acidification	30-50%	50-70%	30-50%	30-50%	30-50%	50-70%
Flood risk	<3%	<3%	<3%	<3%	<3%	<3%
Water logging	3-10%	50-70%	<3%	>70%	>70%	50-70%
Phosphorus export risk	>70%	10-30%	<3%	<3%	<3%	50-70

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is unlikely to contain significant flora, fauna, habitats, or conservation significant assemblages of plants.</p>	Not at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared may contain foraging and roosting habitat for conservation significant fauna.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is unlikely to contain habitat for threatened flora.</p>	Not at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>A portion of the application area, at the western end of the Karnup Road, is mapped as TEC ‘Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region.</p>	Not at variance	Yes <i>Refer to Section 3.2.1, above.</i>
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area. However, portions of the application area are mapped as the Guildford Complex and Beermullah Complex. These vegetation units retain less than 10 per cent of their Pre-European extent.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>Bishop road and Karnup Road sections of the application area occur approximately 1.9 and 0.17 kilometres north and east respectively to unnamed reserves. However, given the limited extent (0.188 hectares) of the clearing and poor linkage to the reserve, the clearing is unlikely to have any significant impact to the conservation value of the reserves.</p>	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>Although Bishop Road and Karnup Road sections of the application area form parts of geomorphic wetlands of the Swan Coastal Plain, with Bishop and Karnup Road classified as a Palusplain and dampland respectively, floristic survey carried out on behalf of the applicant (Emerge 2021) did not identify any riparian or wetland vegetation within the application area. Given the limited extent of the clearing, it is unlikely to impact on - or off-site hydrology and water quality.</p>	Not at variance	No
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>Given the limited extent of clearing (0.188 hectares) comprising vegetation that has previously been disturbed, the condition of the vegetation and the road construction methodologies used, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	No
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u></p> <p>Given no wetlands or Public Drinking Water Source Areas are recorded within the application area, the proposed clearing is unlikely to impact surface or ground water quality.</p>	Not at variance	No
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p>	Not at variance	No

Appendix C. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix D. Photographs of the vegetation

D.1. Images of Bishop Road application area (Shire of Serpentine Jarrahdale 2021)



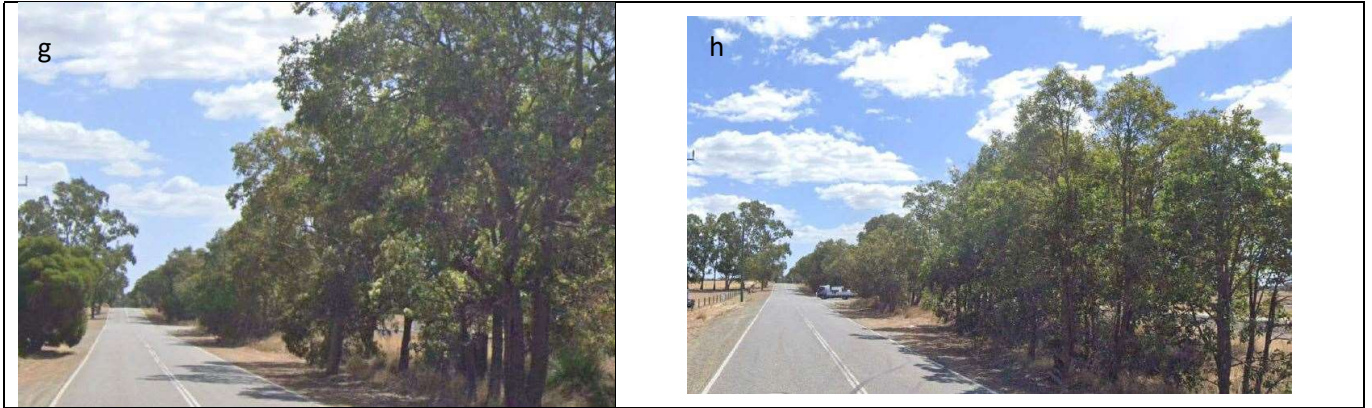


Figure 14 Images (a) to (h) were taken from east (a) to west (h).

D.2. Images of Bishop Road application area (Shire of Serpentine Jarrahdale 2021)





Figure 15 Images (a) to (i) were taken from east (a) to west (i).

Appendix E. Sources of information

E.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

E.2. References

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